Strategies for Optimising Domestic Solid Waste Management Systems in Urban Areas of Australia and South Korea

by

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CERTIFICATE OF AUTHORSHIP/ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Abstract

In today's world, with rapidly developing technologies and booming population, solid waste management has become a major concern. In general, awareness of this problem could lead to the development of improved pollution control technologies and rigorous policies for solid waste handling systems and disposal, in order to minimise the environmental impacts of this waste. In addition, policy-makers need to develop and implement effective municipal solid waste management strategies, taking into account all economic, technical, and environmental objectives and factors.

As the population continues to increase in both Australia and South Korea, the need for strategies to optimise municipal solid waste systems and manage waste is becoming more urgent. It is important to understand that solid waste management is a complex task, which depends as much upon organisation and cooperation between households, communities, private enterprises and government at all levels as it does upon recycling and disposal systems. A conventional view is that either private or public management is more efficient for managing municipal solid waste systems, irrespective of the nature of the resource, or the socio-economic situation of the people. However, because many local governments lack the appropriate financial, technical and human resources, they are neither able nor willing to manage these systems.

Industrialised countries such as Australia and South Korea produce millions of tonnes of municipal solid waste every year, which deplete the world's natural resources and have negative consequences for the environment. In recognition of this problematic global trend, the question of environmental protection for the world's sustainable development through solid waste management systems has been given special attention by many countries, including Australia and South Korea. This study has sought to provide the cities of Sydney and Seoul with tools that will enable them to evaluate the environmental and economic performance of the various elements of their existing or proposed waste management systems. The tools are based on the best information publicly available at the present time, with a commitment to revise this information periodically to ensure that it is up-to-date. The tools are intended as guides only; they do not prescribe the best system for each city. The determination of the best system for a community must take into account several factors, including social and political considerations.

A survey was designed and conducted with the purpose of collecting information on the attitudes of the residents of Sydney and Seoul about municipal solid waste management, how they perceive the current programs of their respective cities in terms of collection, processing and disposal, and how they believe the waste management programs of their cities could be improved in terms of decreasing the amounts of waste generated and effectively managing the collected wastes.

The researcher applied the second version of the White model, the Integrated Municipal Waste (IMW-2) model. The application of the MSW analysis to the two different cities provided an interesting comparison of economic cost, environmental cost and disposal cost. For example, the cost of disposal is quite similar between the two cities. The result does not clearly confirm the environmental superiority of the incineration over the landfill. However, if an incineration facility is introduced in Sydney, an increase of the economic cost of the system will occur. Even though these comparisons are not 100% rigorous, this analysis is still useful for giving some estimation of future MSW management strategies.

The study has used a structured focused comparison to investigate the prevailing waste management programs of Sydney and Seoul and determine the strengths, weaknesses, opportunities and threats in each, in order to develop a waste management model that can be utilised in each city. To achieve optimal results, solid waste management programs must be based on the life-cycle philosophy, filling in the gaps to assess the economic affordability of waste systems, to evaluate the environmental effects involving a product or process, to implement ways to improve or lessen these impacts, and to call for greater public participation in the solid waste management program.

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